

INDIAN SPECIES OF THE DELTOCEPHALINE LEAFHOPPER GENUS *SCAPHOTETTIX* MATSUMURA (HEMIPTERA: CICADELLIDAE)¹

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(With seventytwo text-figures)

The genus *Scaphotettix* Matsumura is redefined. Its relationship with *Scaphoideus* Uhler, with which it is often confused is discussed. Five new species namely, *Scaphotettix agumbensis* sp. nov. (from Karnataka: Agumbe, Bhagamandala), *Scaphotettix arcuatus* sp. nov. (from Tamil Nadu: Kodaikanal, Shembhaganur), *Scaphotettix freytagi* sp. nov. (from Kerala: Thekkadi; Karnataka: Jog Falls, Mudigere), *Scaphotettix malnadicus* sp. nov. (from Karnataka: Jog Falls) and *Scaphotettix quadridus* sp. nov. (from Kerala: Thekkadi) are described and illustrated. *Scaphotettix redundans* (Distant) comb. nov. and *Scaphotettix indicus* (Distant) comb. nov. earlier placed in the genus *Scaphoideus* are also redescribed, illustrated and lectotype designations are made. A key to species of *Scaphotettix* dealt with is also provided.

INTRODUCTION

Matsumura (1941) described the genus *Scaphotettix* for the inclusion of *Scaphotettix viridis* Matsumura from Taiwan. To date the genus is known only from the type species and is not recorded outside Taiwan. During revisionary studies on the genus *Scaphoideus* Uhler of the Indian subcontinent, we found a number of species which looked externally like species of *Scaphoideus* but had distinctive fore wing venation and male genitalia. These were later determined as species of *Scaphotettix*. In this paper we redefine the genus *Scaphotettix* and describe five new species from India and transfer two species of *Scaphoideus* described from India to *Scaphotettix*.

The species of *Scaphotettix* were always collected in moist habitats on grasses mixed with herbs. They were most common in areas receiving an annual rainfall of more than 1000 mm.

The depositories of the types of new taxa are abbreviated as follows.

IARI - Indian Agricultural Research Institute, New Delhi, India.

NHM - The Natural History Museum, London, U.K.

NMNH - The National Museum of Natural

History, Smithsonian Institution, Washington, D.C., U.S.A.

UAS - The University of Agricultural Sciences, Bangalore, GKVK, Bangalore, India.

Genus *Scaphotettix* Matsumura

Scaphotettix Matsumura, 1914:227. Type species *Scaphotettix viridis* Matsumura, by original designation.

Anterior margin of vertex with one or two marginal and a submarginal inverted V-shaped narrow, chocolate brown to black stripe. Head with one, pronotum with an anterior and a posterior submarginal and scutellum with an anterior broader transverse red, reddish brown or orange bands. Fore wing brownish with transparent spots surrounded by fuscous, veins dark brown.

Head including eyes either as wide as or slightly narrower than pronotum; longer medially than adjacent to eye; either acutely angled or obtusely rounded. Vertex 0.72 times as long as interocular width. Frontoclypeus widened dorsally. Clypellus broadened at apex. Pronotum 0.4 times as long as wide. Claval veins either fused in middle or approximated medially and often connected by a cross vein; a cross vein between outer claval vein and claval suture; anteapical cells three, inner cell open behind, outer one smallest, about 0.5 to 0.66 as long as median anteapical cell; one reflexed vein connecting basal outer angle of outer anteapical cell

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with costal margin. Fore femora compressed; with a row of stout, short, spines on ventral margin in addition to 10-15 hair-like setae on mesoapical area. Mid femora compressed with a row of some short and some long, stout spines along mesal margin.

Male pygofer either with or without a process on caudal margin; with tufts of long or scattered setae. Subgenital plates triangular, with rounded apex, with an oblique row of stout setae in addition to long hair-like setae. Style slender, elongate or robust, preapical lobe well developed, ventral area of apophysis serrated. Connective Y-shaped, articulated with aedeagus, without paraphysis. Aedeagal shaft slender, elongate or stouter, wider at base, with or without processes. Gonopore apical or subapical.

First pair of valvulae of female ovipositor with scale-like sculpturing arranged in rows. Second pair of valvulae with 10-17 teeth on cutting edge.

Remarks: *Scaphotettix* resembles some species of *Scaphoideus* externally, namely *S. festivus* Matsumura, *S. consanguineus* Distant, *S. hieroglyphicus* Distant and several undescribed species from India and Sri Lanka. However, *Scaphotettix* is only distantly related to *Scaphoideus* and can be distinguished by the following table of characters.

TABLE

Characters	<i>Scaphotettix</i>	<i>Scaphoideus</i>
Ratio of width of frontoclypeus at apex to that between antennal base.	0.9 to 1.25	1.32 - 1.68
Claval veins	fused or closely approximated and/or joined by a cross vein	never fused and connected by a cross vein
Reflexed vein in costal area	one	two or more
Paraphysis	absent	always present

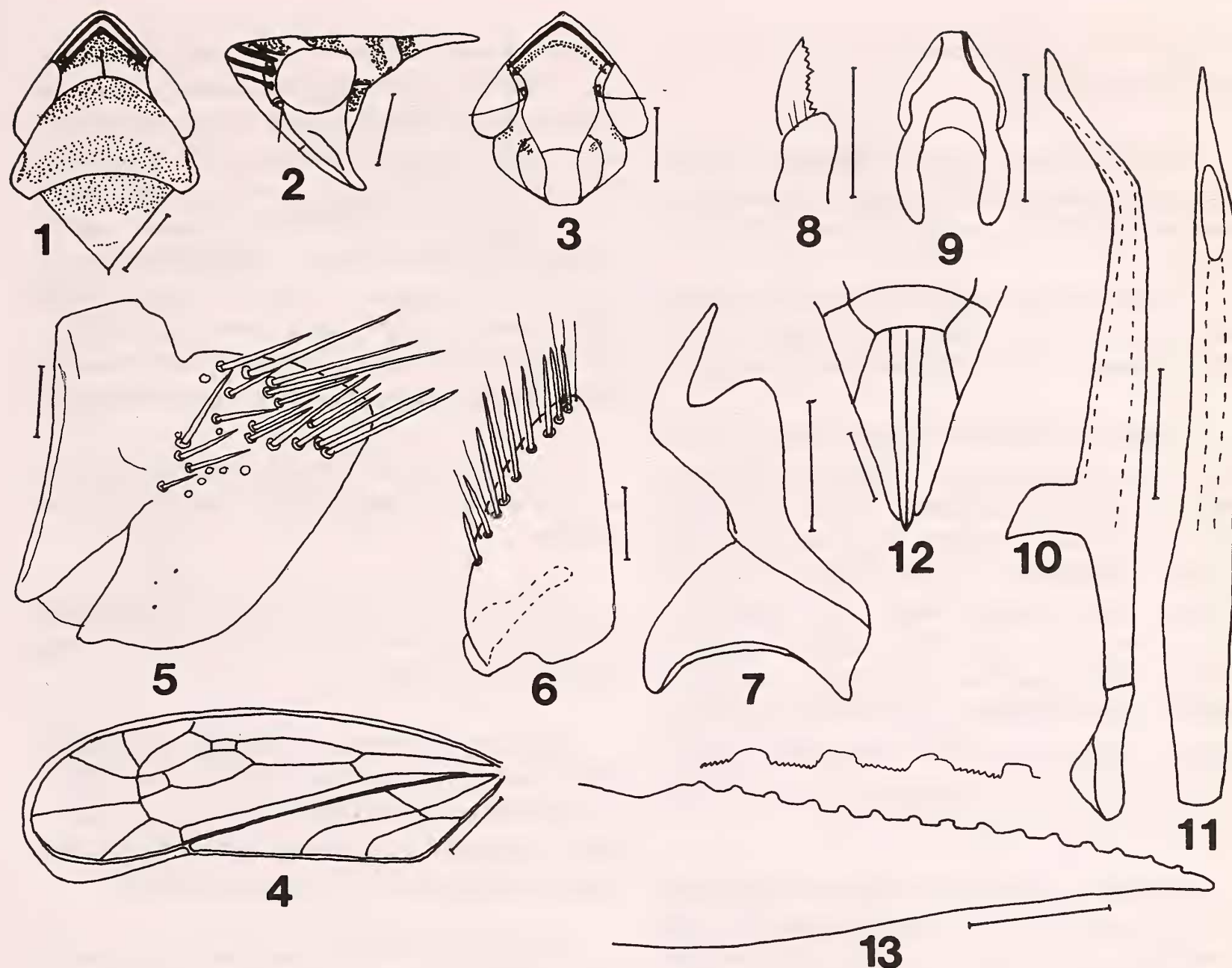
KEY TO SPECIES OF *Scaphotettix* Matsumura

- 1. Claval veins fused (Fig. 24); aedeagus with apical pair of appendages strongly recurved and directed ventrally (Fig. 29)*S. freytagi* sp. nov.
- Claval veins not fused; either approximated and/or connected by across vein (Fig. 4); aedeagus when with appendage not as above..... 2
- 2. Male pygofer without a caudal process 3
- Male pygofer with a caudal process (Figs 36, 45, 54, 64)4
- 3. Aedeagal shaft straight ; bent dorsally in apical 0.33; without appendages (Fig.10).....*S. indicus* (Distant)
- Aedeagal shaft strongly, uniformly curved caudodorsally; with a pair of slender, short appendages at apical 0.66 (Fig.19)*S. arcuatus* sp. nov.
- 4. Aedeagus with two pairs of apical appendages (Figs. 69, 70); caudal lobe of pygofer gradually narrowed to an attenuated process, dorsal margin with a short, caudally directed process (Fig. 64).....*S. quadrifidus* sp. nov.
- Aedeagus with one pair of apical appendages (Figs. 41, 50); caudal lobe of pygofer abruptly narrowed and produced into a spine-like process (Figs. 36, 45, 54)..... 5
- 5. Appendages of aedeagus with crenulate margin (Fig. 41); stem of connective more than 1.5 times as long as its arm (Fig. 39)*S. redundans* sp. nov.
- Appendages of aedeagus smooth or with single tooth at mid length (Figs 50, 59) : stem of connective 0.5 times as long as its arm (Fig. 48)6
- 6. Aedeagal shaft slender, evenly curved; apical appendage of shaft in caudal aspect L-shaped, with a tooth at midlength (Fig. 50)..... *S. agumbensis* sp. nov.
- Aedeagal shaft stout, wider near base than at apex, appendage of shaft evenly curved ventrally in caudal view (Fig.59) *S. malnadicus* sp. nov.

Scaphotettix indicus (Distant) comb. nov.
(Figs. 1 - 13)

Scaphoideus indicus Distant, 1908: 374. Lectotype female, here designated, Burma (NHM, examined).
Scaphoideus festivus sensu Ishihara, 1961: 252, not Matsumura, 1902.

Ochraceous. Markings on head and thorax as described in generic diagnosis. A submarginal longitudinal stripe on extreme lateral area of pronotum fuscous. Dorsal half of episternum and dorsal 0.75 of mesepimeron dark fuscous. Scutellum margined by dark fuscous apically. Fore wing fuscous, venation darker, apex of fore wing broadly



Figs. 1-13. *Scaphotettix indicus* (Distant): 1. Head and thorax; 2. Same, Profile; 3. Face; 4. Fore wing; 5. Male pygofer; 6. Subgenital plate; 7. Style; 8. Apophysis of style; 9. Connective; 10. Connective and aedeagus, lateral view; 11. Aedeagus ventral view; 12. Ovipositor; 13. Apex of second pair of valvula (Scale indicates 0.5 mm in Figs. 1-4 and 12 and 0.1 mm in others).

dark fuscous except hyaline appendix. Legs ochraceous, fore tibiae striped with brown; mid tibiae with three brown spots, basal and median trasomeres of mesothoracic leg brown; apex of hind tibia, basitarsus, entire second tarsomere, basal half of third tarsomere piceous.

Vertex conically produced in front, median sulcus reaching 0.8 length. Pronotum shorter than scutellum. Claval veins approximated and connected by a cross vein, outer anteapical cell 0.5 as long as

median cell which is wider in middle.

Male genitalia : Caudal margin of pygofer abtusely rounded with scattered setae, without caudal process, tergum of pygofer well sclerotized. Valve with rounded caudal margin. Style robust, with apophysis laterally directed, with a pointed apex, ventral margin serrate. Stem of connective 0.5 as long as arm. Aedeagus elongate, tubular, preatrium 0.25 as long as total length, dorsal apodeme short, stout; shaft tapered caudally, curved abruptly dorsally

at apical 0.33, apex compressed, blade-like. Gonopore subapical.

Female genitalia: Seventh sternum as long as sixth, caudal margin rather straight. Second pair of valvulae with 15 teeth, margin between teeth finely serrate.

Measurements: Male 4.30 to 4.60 mm long, 1.20 to 1.25 mm wide across eyes. Female 4.60 to 4.70 mm long, 1.25 to 1.30 mm wide across eyes.

Material examined: Lectotype female, "Type, H.T. (on red bordered disc)" "*Scaphoideus indicus* Distant, type" "Myitta, Doherty" "Distant Coll. 1911-383" here designated (NHM). Paralectotype female "Assam, Margherita" "Distant Coll. 1911-383" (NHM). *Other material:* INDIA: Uttar Pradesh: 3 males, 5 females, Dehra Dun, 28.iv.1975; West Bengal: 1 male, Calcutta, 11.xi.1981; 3 males, 2 females, 10 km N. Siliguri, 1.i.1981; Kerala: 1 female, Walayar Forest, 26.x.1975; Karnataka: 1 male, Bannerghatta (24 km S. Bangalore), 9.viii.1979, all collected by C.A. Viraktamath (UAS).

Remarks: *S. indicus* is unique among species of *Scaphotettix* in not having aedeagal shaft appendages. Its wings are much darker than in known species of *Scaphotettix*. Ishihara (1961) misidentified this species as *Scaphoideus festivus* Matsumura as is evident from his excellent figures.

Scaphotettix arcuatus sp. nov.
(Figs. 14 - 20)

Lateral margin of pronotum with a fuscous line. Proepimeron fuscous. Apices of claval veins dark brown, much broadly so on inner claval vein; clavus with three large whitish hyaline spots; veins marked with dark brown; apices of fore wings hyaline except submarginal narrow fuscous band along marginal vein. Legs as in *S. indicus*.

Head obtusely rounded, interocular width 1.49 as wide as median length of vertex. Outer claval vein

slightly incurved but not touching inner claval vein.

Male genitalia: Pygofer caudally rounded, without process, setae scattered. Style with parallel sided middle portion, apophysis with a series of ridges on ventral margin. Connective with stem 0.5 as long as arm, anteriorly bilobed. Aedeagus elongate, slender, with well developed, unpigmented dorsal apodeme 0.5 as long as shaft, distally bilobed; shaft caudo-dorsally curved, compressed, apex bifid, a pair of slender, slightly asymmetrical, short, ventrally directed processes at apical 0.25. Gonopore subapical.

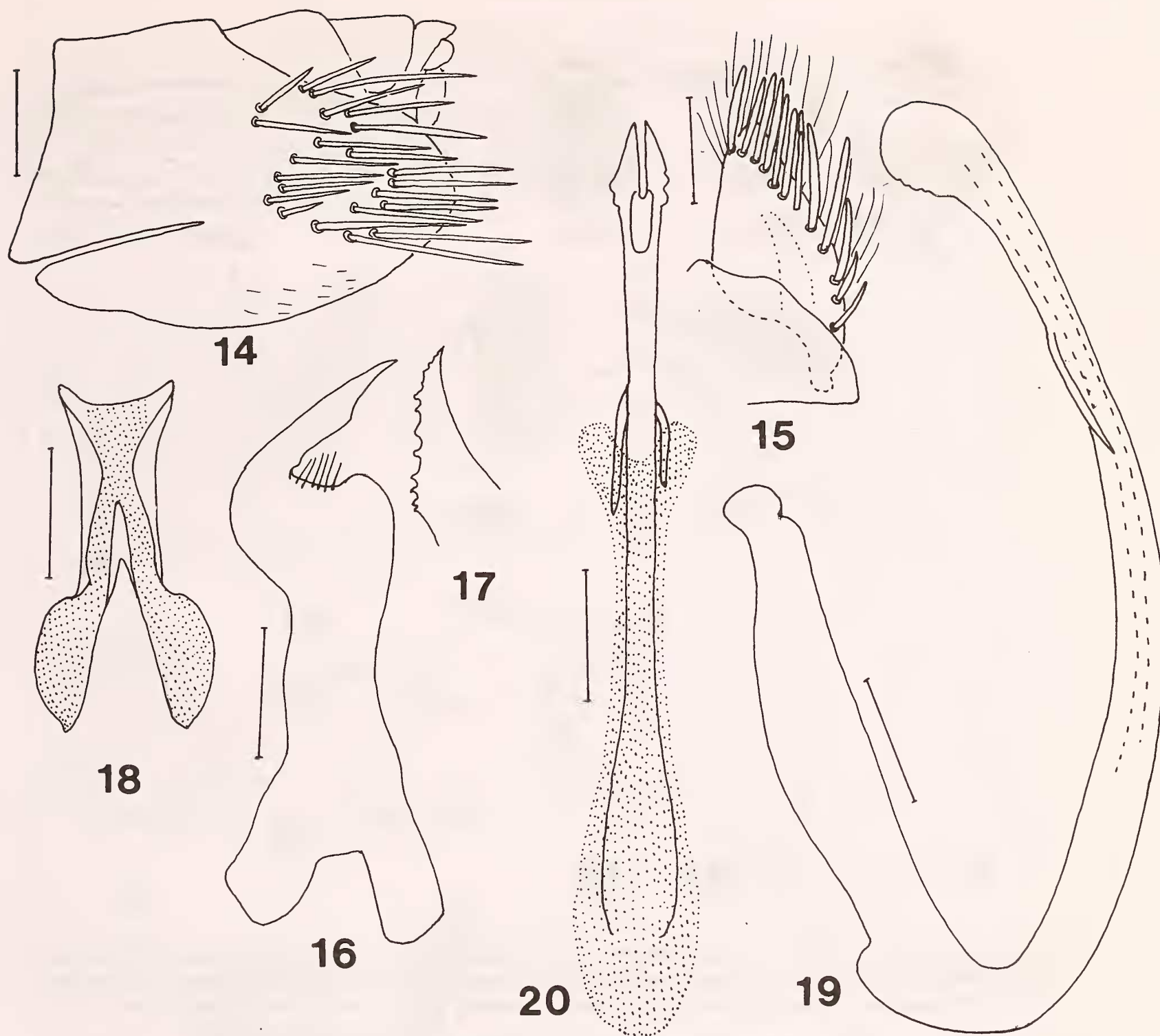
Female genitalia: Seventh sternum three times as long as sixth; hind margin broadly produced medially.

Measurements: Male 5.30 to 5.40 mm long, 1.30 mm wide across eyes., Female 6.00 mm long, 1.50 wide across eyes.

Material examined: Holotype male, INDIA: Tamil Nadu: Shembhaganur, 1300 m, 18.viii.1979, I. Dworakowska Coll. (UAS). Paratypes: 1 male, 1 female, mounted on the same card, *S. INDIA:* Madras, Kodaikanal, T.V. Campbell (NHM).

Remarks: The specimens from the type series of *Scaphoideus redundans* Distant collected from Kodaikanal belong to *S. arcuatus* whereas those from Lovedale to *S. redundans*. Externally both species resemble very closely, however, *S. arcuatus* has a much elongate, slender aedeagal shaft with very short subapical processes while *S. redundans* has shorter, stouter aedeagal shaft with longer, stouter, apical aedeagal shaft appendages. *S. arcuatus* appears to be related to *S. indicus* as they share the character of pygofer and elongate aedeagal shafts. The aedeagal shaft of *indicus* lacks the process whereas *arcuatus* has slender, short, asymmetrical pair of processes.

Scaphotettix freytagi sp. nov.
(Figs. 21 - 32)



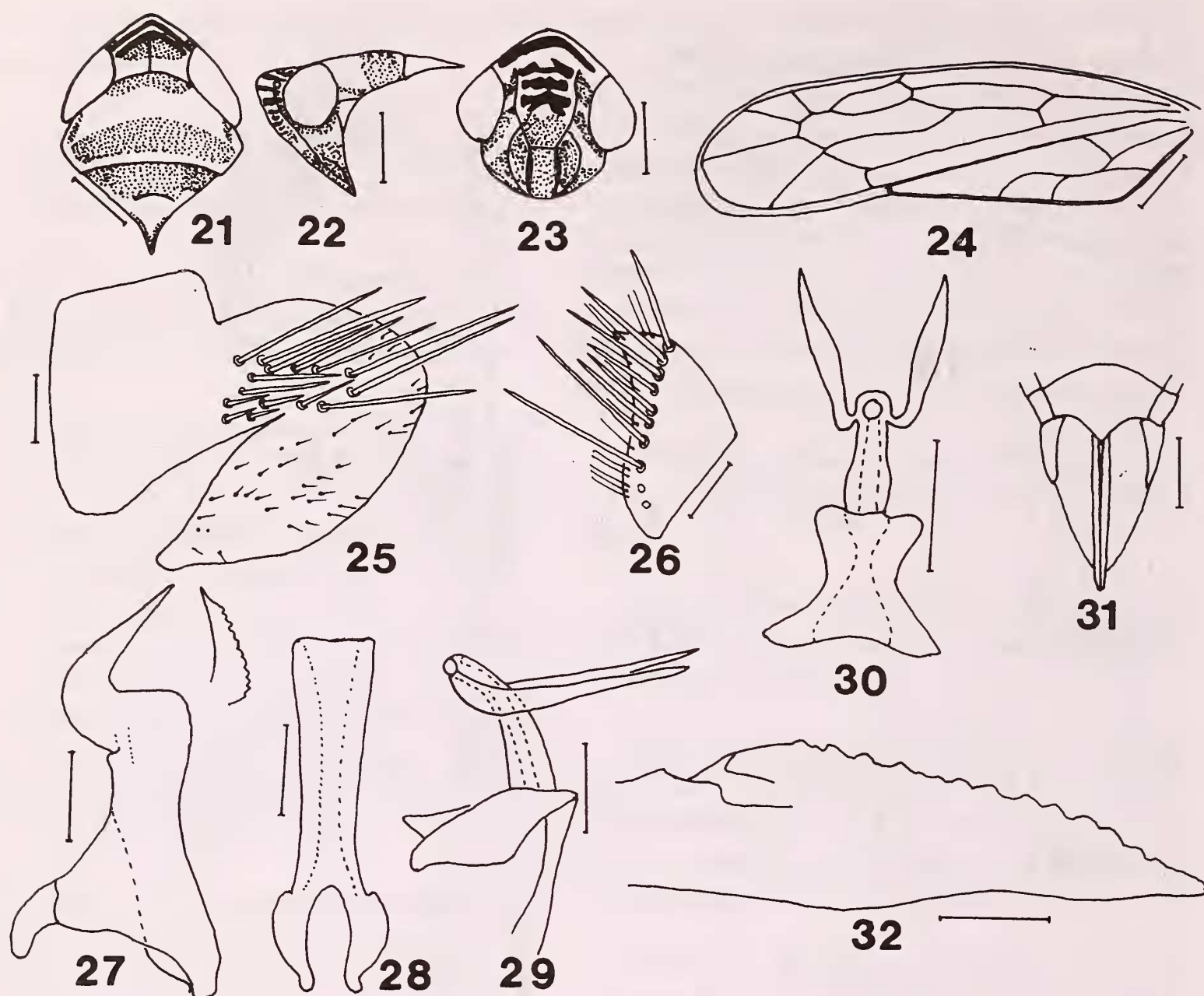
Figs. 14 - 20. *Scaphotettix arcuatus* sp. nov. : 14. Male pygofer; 15. Valve and subgenital plate; 16. Style; 17. Apophysis of style; 18. Connective; 19. Aedeagus, lateral view; 20. Aedeagus, dorsal view. (Scale indicates 0.1 mm.)

Colour as in *S. indicus* but reddish markings on head and thorax are very bright especially in female. In male, face with a few medially interrupted bands at basal half of frons, antennal pits, a spot below each eye, lateral margin, discal spot to lorum dark brown to piceous. Claval veins, and some corial veins bright red. In female, face darker especially in apical half including parts of genae, entire lorum, clypellus, apical 0.33 of frons dark brown, a transverse

fascia across middle of frontoclypeus and middle of genae ochraceous.

Head obtusely rounded; interocular distance on vertex 1.33 times as wide as median length. Claval veins fused in middle.

Male genitalia: Pygofer with rounded caudal margin, with scattered setae, without process. Style



Figs. 21-32. *Scaphotettix freytagi* sp. nov. : 21. Head and thorax; 22. Same profile; 23. Face; 24. Fore wing; 25. Male pygofer; 26. Subgenital plate; 27. Style; 28. Connective; 29. Aedeagus; lateral view; 30. Same caudodorsal view; 31. Ovipositor; 32. Female second pair of valvula. (Scale indicates 0.5 mm in Figs. 21-24 and 31, and 0.1 mm in others.)

stout, apophysis curved with serrated ventral margin. Stem of connective twice as long as arm. Aedeagus rather L-shaped, dorsal apodeme well developed, bifid distally; shaft straight, directed caudodorsally with a pair of apical, long, strongly recurved appendages directed ventrally and caudally. Gonopore apical.

Female genitalia: Seventh sternum three times as long as sixth; hind margin conically produced in middle. Second pair of valvulae with 15 teeth,

margin of teeth finely serrate.

Measurements: Male 4.40 to 4.70 mm long, 1.17 to 1.22 mm wide across eyes. Female 5.00 to 5.20 mm long and 1.35 to 1.40 mm wide across eyes.

Material examined: Holotype male, INDIA: Kerala: Thekkadi, (840m), 27.iii.1977, C.A. Viraktamath (UAS). Paratypes: 4 males, 5 females, data as for holotype, 2 males, 4 females, data as for holotype but collected by S. Viraktamath; 11 males, 7 females, data as for holotype but collected on

26.iii.1977 by C.A. Viraktamath (3 males, 2 females), S. Viraktamath (3 males, 1 female), and B. Mallik (5 males, 4 females); Karnataka: 1 male, Mudigere, 7.iv.1975, C.A. Viraktamath; 3 females, Jog Falls, 8.v.1976, B. Mallik; 1 male, 17.xi.1976, B. Mallik; 1 male, 10.xi.1976, C.A. Viraktamath (IARI, NHM, NMNH, UAS).

Remarks: *S. freytagi* is distinctive among the species of *Scaphotettix* in that the claval veins are fused in the middle. It externally resembles *S. quadrifidus* from which it differs in having only one pair of aedeagal shaft appendages, much brighter coloration and darker face.

The species is named in honour of Dr Paul H. Freytag, Professor of Entomology, University of

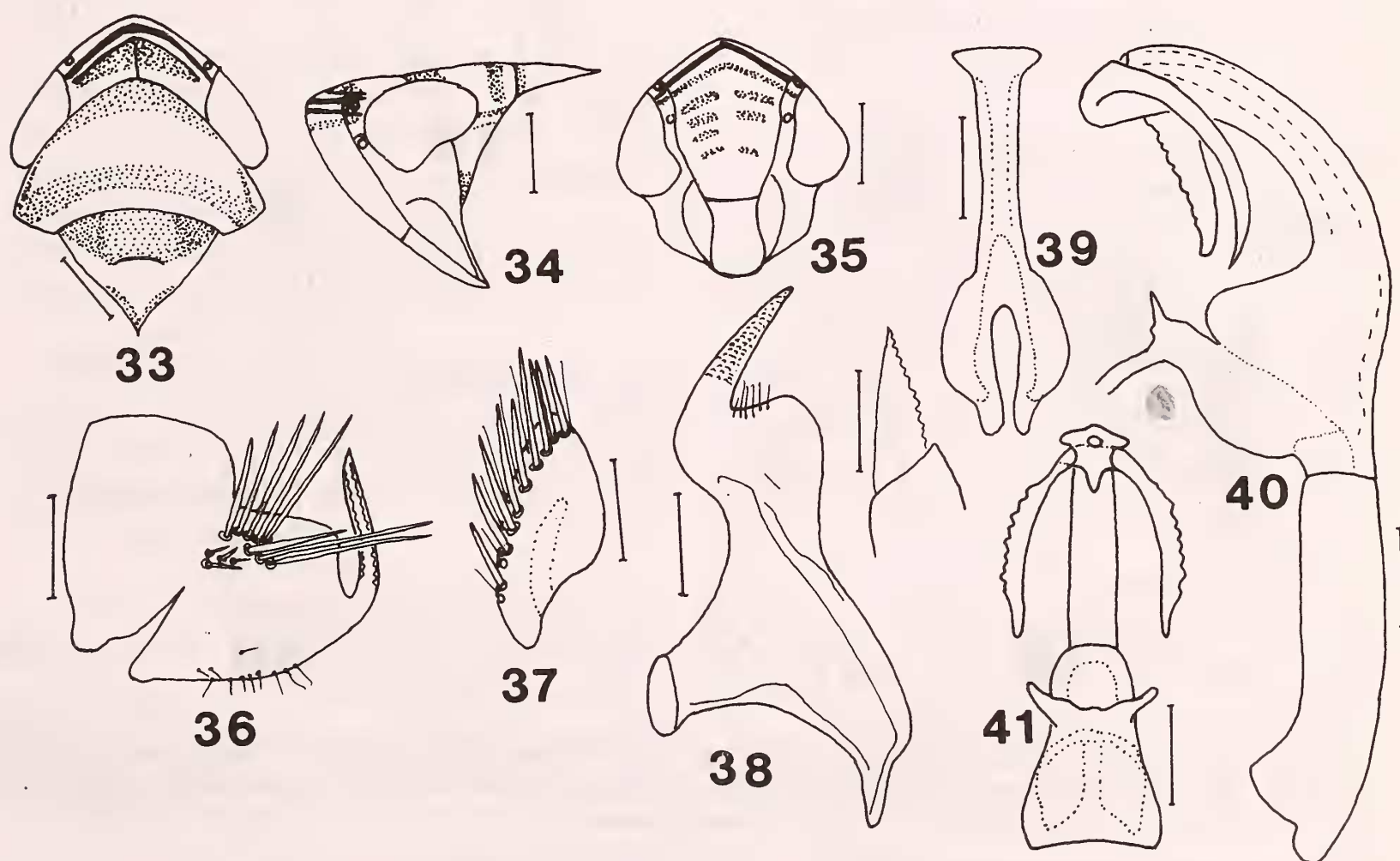
Kentucky, Lexington, U.S.A.

***Scaphotettix redundans* (Distant) comb. nov.**
(Figs. 33 - 41)

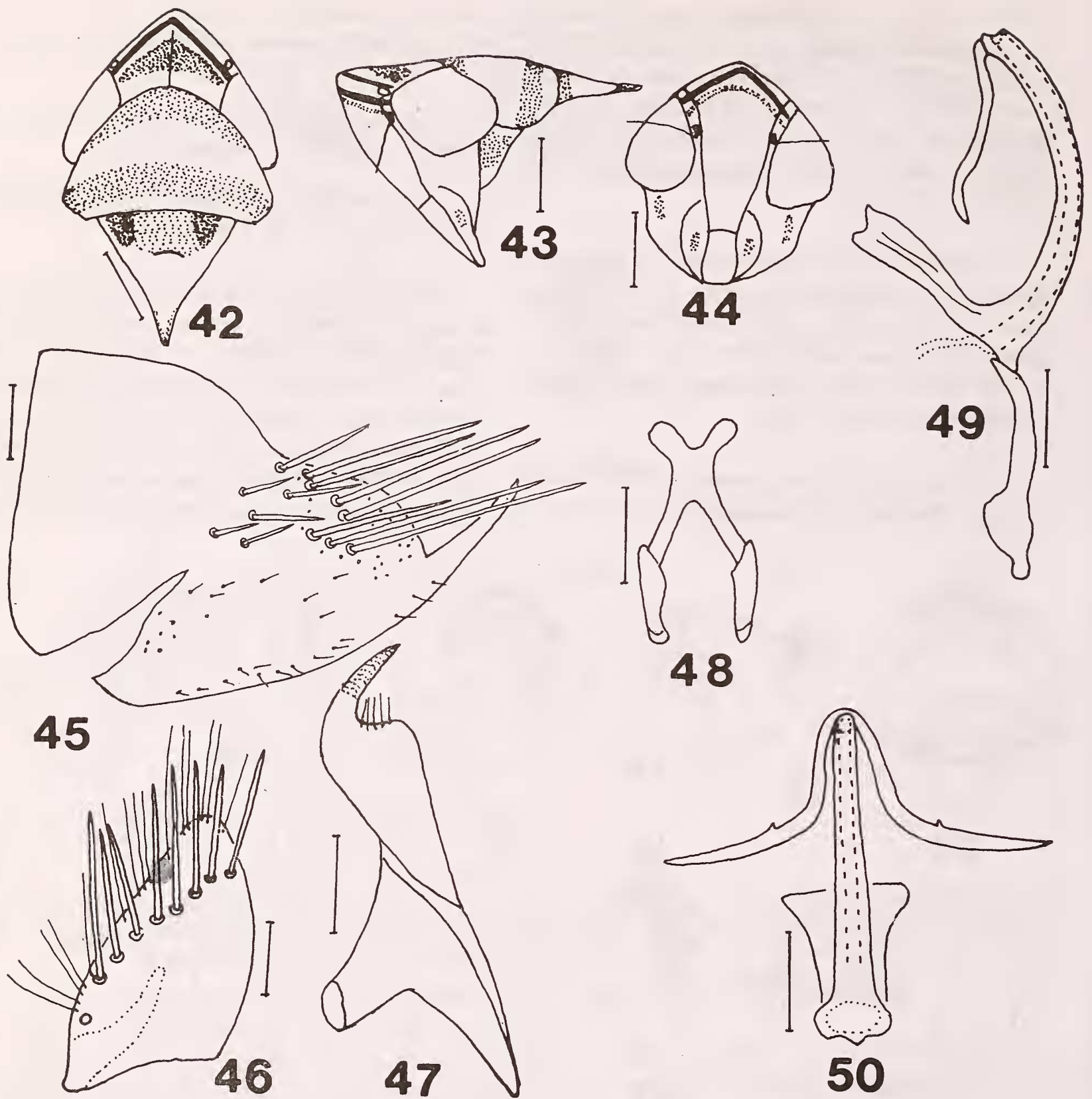
Scaphoideus redundans Distant, 1918:64. Lectotype, here designated Nilgiris (NHM, examined).

Coloration as described by Distant (1918) and very similar to that of *S. arcuatus*.

Male genitalia: Pygofer with a ventral dorsally produced process, exceeding dorsal margin of pygofer. Style with laterally curved apophysis having serrated ventral surface. Connective with stem twice as long as arm. Aedeagus with well developed but short dorsal apodeme, shaft curved caudo-dorsally in lateral aspect slightly broader at apex than at base, with a pair of apical, latero-anteriorly directed blade-



Figs. 33-41. *Scaphotettix redundans* (Distant): 33. Head and thorax; 34. Same, profile; 35. Face; 36. Male pygofer; 37. Subgenital plate; 38. Style and apophysis of style; 39. Connective; 40. Connective and aedeagus, lateral view; 41. Aedeagus, dorsal view. (Scale Indicates 0.5 mm in Figs. 33-35 and 0.1mm in others.)



Figs. 42 - 50. *Scaphotettix agumbensis* sp. nov. : 42. Head and thorax; 43. Same, profile; 44. Face; 45. Male pygofer; 46. Subgenital plate; 47. Style; 48. Connective; 49. Connective and aedeagus; 50. Aedeagus, caudal view. (Scale indicates 0.5mm in Figs. 42-44 and 0.1mm in others.)

like appendages with crenulate margin.

wide across eyes.

Measurements: Male 5.8 mm long, 1.45 mm

Material examined: Lectotype, "Type, H.T.

(on red bordered disc)" "Nilgiri Hills, Lovedale, T.V. Campbell" "S. India, E.A. Butler, 1915 -60" here designated (NHM). Paralectotype: 1 female data as for lectotype, mounted along with lectotype on the same card (NHM). *Other material*: INDIA: Tamil Nadu: 1 male, Naduvattam, 6.vi.1977, C.A. Viraktamath (UAS).

Remarks: This species can be easily distinguished by the aedeagal shaft appendages with crenulate margin. It is distantly related to *S. agumbensis* and *S. malnadicus* with which it shares the similarly placed aedeagal shaft process and pygofer process but differs in having the stem of connective twice as long as arms.

***Scaphotettix agumbensis* sp. nov.**
(Figs. 42 - 50)

Ochraceous. Anterior margin of red band on vertex without a dark brown line. Fore wing pale brownish hyaline with prominent dark brown markings surrounding hyaline spots distributed on clavus and corium; apex of clavus, a spot at apex of inner claval vein, submarginal band on apex of fore wing dark brown. Leg coloration as in *S. indicus*.

Head bluntly conical, slightly narrower than prothorax. Vertex slightly shorter than interocular width. Pronotum 1.8 times as wide as long. Claval veins approximated in middle, outer anteapical cell 0.75 as long as median cell.

Male genitalia: Ventrocaudal angle of pygofer lobe produced into a spine-like process directed caudodorsally. Style slender, elongate, apophysis short, slender, strongly curved laterally, its surface pustulated. Stem of connective 0.5 as long as arms, strongly bifid anteriorly. Aedeagus slender, dorsal apodeme thin, plate-like, 0.5 as long as a shaft; shaft gradually curved caudodorsally, of uniform width, with a pair of apical appendages, each appendage directed anteriorly at basal 0.33 then abruptly directed

laterally, with a tooth at midlength. Gonopore apical.

Measurements: Male 5.00 mm long, head 1.27 mm wide across eyes.

Material examined: Holotype male, INDIA: Karnataka: Agumbe, 23.xi.1982, H.V.A. Murthy Coll. (UAS). Paratype 1 male, INDIA: Karnataka: Bhagamandala, 1300 m, 25.i.1980, S. Viraktamath Coll. (NHM).

Remarks: *S. agumbensis* shares the character of anteriorly bifid stem of connective and pygofer process with that of *S. malnadicus*. It has however, more slender, elongate style with shorter apophysis, elongate, slender differently shaped appendages of aedeagal shaft. It is also related to *S. quadrifidus* sp. nov. as discussed under that species.

***Scaphotettix malnadicus* sp. nov.**
(Figs. 51 - 59)

Coloration of head and thorax as in generic diagnosis. Scutellum with basal triangles brown, red band between them interrupted by ochraceous line, apical half yellowish white with piceous lateral margins. Forewing as in *S. agumbensis*.

Head bluntly conical, slightly narrower than pronotum. Vertex 0.78 as long as interocular distance. Pronotum 1.8 times as wide as long. Claval veins approximated in the middle. Outer anteapical cell 0.75 as long as median anteapical cell.

Male genitalia: Caudoventral margin of pygofer with a caudally directed process, caudodorsal margin membranous. Style with slender, strongly, laterally directed apophysis with serrated ventral margin connective rather x-shaped, anterior arm very short, caudal arms slender, elongate. Aedeagus with poorly developed dorsal apodeme, shaft slightly caudodorsally curved, broader at base than at apex with a pair of apical anteroventrally curved appendages. Gonopore subapical.

Measurements: Male 4.90 mm long, 1.30 mm

wide across eyes.

Material examined: Holotype male, INDIA: Karnataka : 35 Km W of Jog Falls, 534 m, 18.xi.1976, C.A Viraktamath (UAS).

Remarks : *S. malnadicus* is closely related to *S. agumbensis* from which it can be distinguished by the stouter aedeagal shaft, differently curved shaft appendages and the shape of pygofer.

***Scaphotettix quadrifidus* sp. nov.**
(Figs.60 - 72)

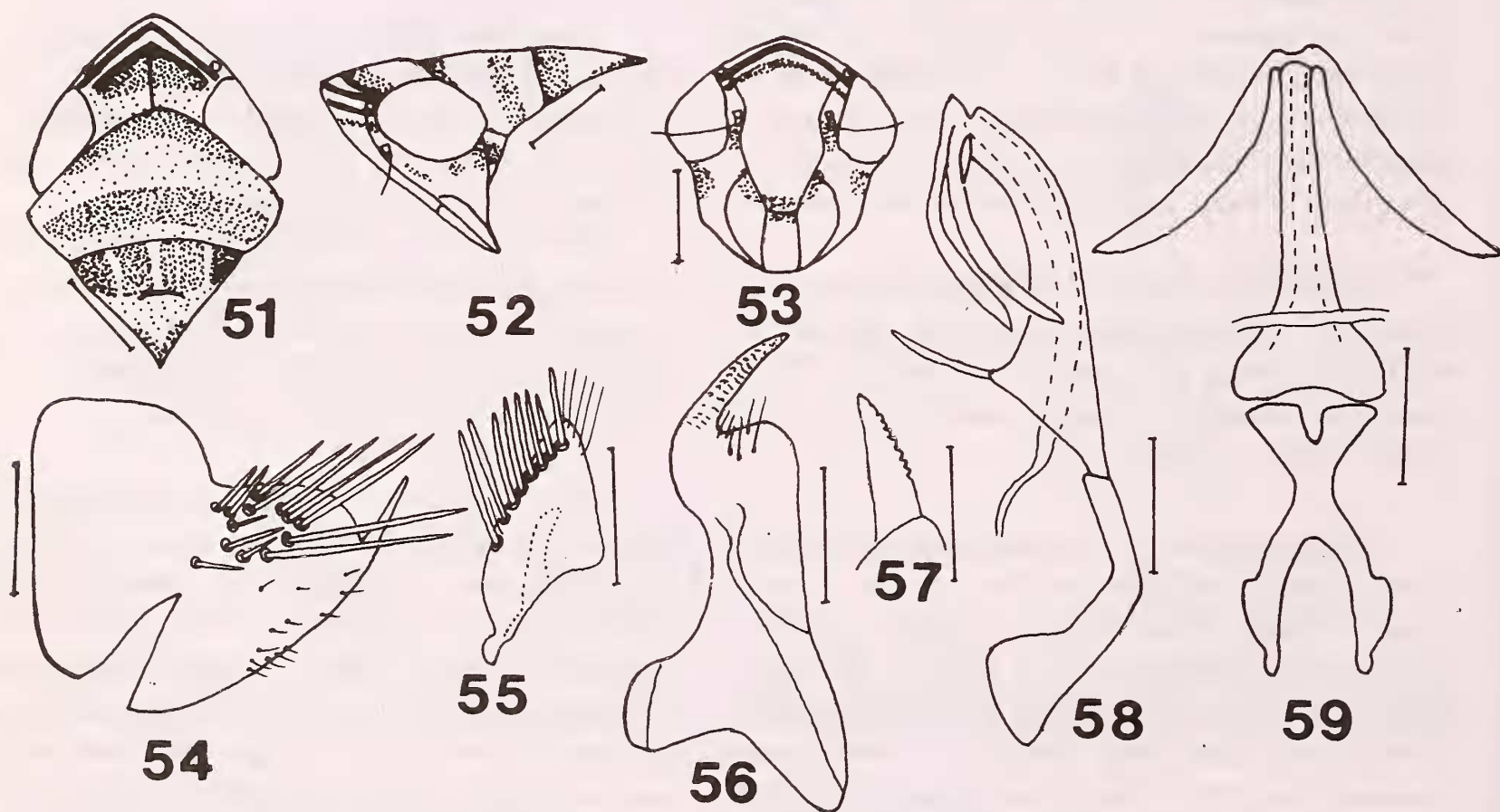
Coloration as described in generic diagnosis. Dorsal half of frons in male brownish ochraceous, in female with a series of medially interrupted transverse fasciae, lateral frontal sulcus, antennal half of scutellum beyond red band ochraceous, apical half yellow. Fore wing coloration as in *S. agumbensis* with darker venation, claval veins red,

more so in female. Leg coloration as in *S. indicus*.

Head 0.75 as long as interocular distance. Pronotum 1.7 times as wide as long. Claval veins connected by a cross vein.

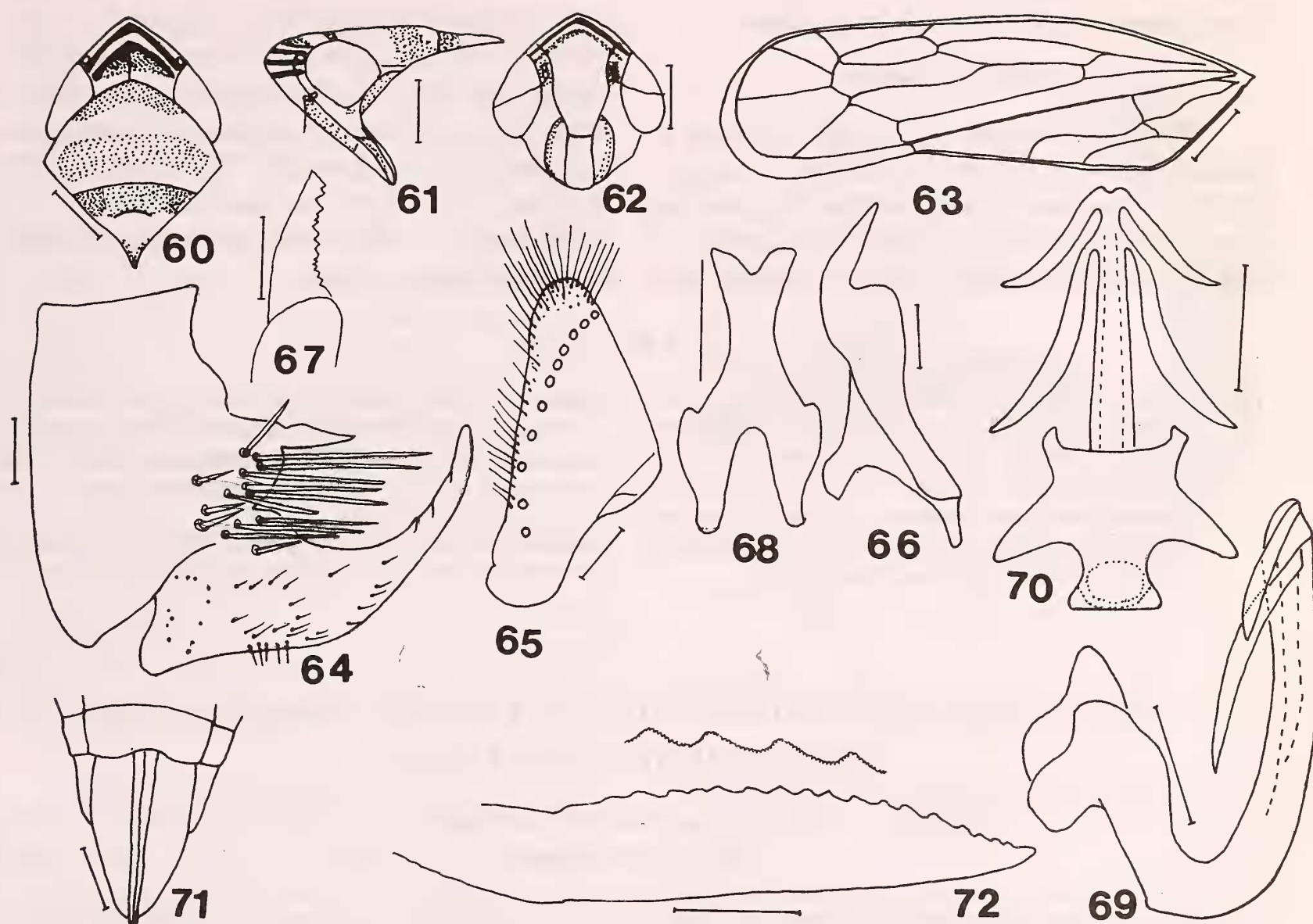
Male genitalia: Pygofer lobe caudally attenuated gradually and produced into a dorsally curved process caudodorsal margin with a short caudally directed process. Style with short, finger-like apophysis directed laterally, with transversely rugose ventral area. Connective with stem 0.5 as long as arm. Aedeagus rather J-shaped with well developed dorsal apodeme, shaft of uniform width with a pair of apical and another pair of subapical appendages. Gonopore apical.

Female genitalia : Seventh sternum as long as sixth, its caudal margin medially, slightly, concavely excavated. Second pair of valvula with 17 teeth,



Figs. 51-59. *Scaphotettix malnadicus* sp. nov. : 51. Head and thorax ; 52. Same, profile ; 53. Face; 54. Male pygofer; 55. Subgenital plate ; 56. Style ; 57. Apophysis of style ; 58. Connective and aedeagus, lateral view; 59. Same, dorsal view.

(Scale indicates 0.5 mm in Figs. 51-53 and 0.1 mm in others.)



Figs. 60 - 72. *Scaphotettix quadrifidus* sp. nov. : 60. Head and thorax; 61. Same, profile; 62. Face; 63. Fore wing; 64. Male pygofer; 65. Subgenital plate; 66. Style; 67. Apophysis of style; 68. Connective; 69. Aedeagus, lateral view; 70. Same, dorsal view; 71. Ovipositor; 72. Female second valvula. (Scale indicates 0.5mm in Figs. 60-63 and 71, and 0.1mm in others.)

entire dorsal margin including teeth finely crenulate. NMNH, UAS).

Measurements: Male 5.3 to 5.5 mm long 1.37 to 1.42 mm wide across eyes. Female 5.8 to 6.0 mm long, 1.47 to 1.62 mm wide across eyes.

Material examined: Holotype male, INDIA: Kerala: Thekkadi (840 m). 26.iii.1977, C.A. Viraktamath (UAS). Paratypes: 3 males, 4 females, data as in holotype; 1 male, data as in holotype but collected on 27. iii. 1977., 4 males, 3 females, data as in holotype but collected by S. Viraktamath (2 males, 3 females) and Mallik (2 males) (IARI, NHM,

Remarks : *S. quadrifidus* can be easily recognised by its aedeagal shaft appendages which are four in number. The species *S. quadrifidus*, *S. agumbensis* and *S. malnadicus* form a more or less uniform group as they share the characters of pygofer and connective. They are related to *S. redundans* in this character but the latter has a much longer stem of the connective. Externally *S. quadrifidus* resembles *S. freytagi* in having bright red coloured bands and claval veins. However, the

claval veins are not fused in *S. quadrifidus*.

ACKNOWLEDGEMENTS

We thank Dr Paul H. Freytag, Professor of Entomology, University of Kentucky, Lexington, U.S.A. for the generic placement of *Scaphoideus redundans* and *S. indicus* and for the illustrations of type series of *Scaphoideus* species described from

India received through Dr Baldev Sharma, University of Jammu, Jammu. The first author thanks Dr W.J. Knight and Mr. M.D. Webb for allowing him to study the type series of species of *Scaphoideus* described by Distant and Mr. Webb and Dr M.R. Wilson, CAB International Institution of Entomology, London for the hospitality provided during his stay in London.

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ON TWO NEW SPECIES OF *CHELONUS* PANZER (HYMENOPTERA: BRACONIDAE) FROM INDIA¹

S.M. KURHADE² AND P.K. NIKAM³
(With six text-figures)

Chelonus (*Microchelonus*) *pikeni* sp. nov. and *Chelonus* (*Microchelonus*) *raoi* sp. nov. are described and illustrated. The Key to the Indian species of *Chelonus* (*Microchelonus*) by Rao and Chalikwar (1971) is amended.

INTRODUCTION

Chelonus is a moderate sized genus belonging to the subfamily Cheloninae of the family Braconidae. *Chelonus* is divided into two subgenera, namely *Chelonus* Panzer and *Microchelonus* Szepligeti. The earlier works on the Indian species of *Chelonus* are by Subba Rao (1955), Gupta (1955) and Rao and Chalikwar (1971). In the present work two new taxa belonging to the genus *Chelonus*, namely *Chelonus* (*Microchelonus*) *pikeni* and *Chelonus*

(*Microchelonus*) *raoi* are described and the key to the Indian species of *Chelonus* (*Microchelonus*) by Rao and Chalikwar (1971) is amended to include the new taxa.

Types and other material of these species are in the collection of the junior author for the time being and will be deposited in the National Collection of the Zoological Survey of India, Calcutta, India.

Chelonus (*Microchelonus*) *pikeni* sp. nov.

(Figs. 1-3)

MALE : 3.1 mm (Fig. 1). Head (Fig. 2) transverse, 2.5 x as wide as long; vertex rugose, pubescent;

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